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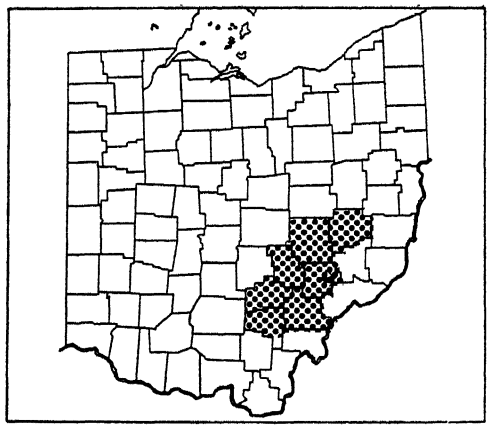
COST OF PRODUCING CROPS ON SELECTED HILL LAND FARMS IN SOUTHEASTERN OHIO



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COST OF PRODUCING CROPS ON SELECTED HILL LAND FARMS IN SOUTHEASTERN OHIO

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This study is the third in a series to determine the economics of producing the major farm crops in Ohio. The first one was made on 124 farms in 1958 in the west central part of the state[2]. The second study was made on 153 farms in 1959 in the old lakebed area of northwestern Ohio[3]. Both of these studies were conducted on level land. The third study involved 100 farms in 1960 in seven southeastern Ohio counties. It was made on hilly cropland and is described in this bulletin.

OBJECTIVES

The main objectives of this study were as follows:

1. To determine the amount of man labor, tractor power, machine time, fertilizer, lime, seed, and spray material used by farmers to raise and harvest an acre of corn, wheat, and hay on hill land in southeastern Ohio.

2. To determine the cost of producing an acre of corn, wheat, and hay on cropland that is contour stripped cropped or field stripped.

3. To determine the amount of time required to produce farm crops on hill land when different size tractors and machinery are used.

HOW STUDY WAS MADE

This study was confined to the hill land of seven southeastern Ohio counties; namely, Muskingum, Guernsey, Perry, Hocking, Morgan, Vinton, and Athens. In a situation where a farmer had both hill and bottom land, crop cost data were obtained as near as possible for hill land only. Soil surveys for these seven counties showed the following amounts of cropland in the various capability classes: I and II, 30 percent; class III, 52 percent; and classes IV, VI, and VII, 18 percent[4]. These figures indicate that about two-thirds of the cropland is subject to severe erosion when corn or small grain crops are raised unless proper mechanical and agronomic practices are followed. In this study, most of the cropland was farmed in contour strips or narrow fields that were roughly on the contour. Fields were often very small and in some cases stony soils increased the amount of time needed to perform some of the field operations.

The following data were collected on 100 farms for the 1960 crop season: land use, crop yields, and amount of labor, tractor power, equipment, fertilizer, manure, lime, seed and spray used. Most of the crop cost information was recorded by the farmers in account books that were designed especially for this project. Personal interviews also were used to obtain some additional data at the time the record books were collected for analysis.

In selecting the farms to be studied, the first step was to contact county agricultural agents and vocational agriculture instructors for the names of farmers who might keep the following records on hill land as the crop work was done: acres of land covered; number of man and tractor hours used; number of men in the crew; and size of tractor and machine used for a specific operation. The second step was to contact the entire list of farmers, individually or in groups, to determine who would be interested in participating in the study. At this time, each farmer who agreed to cooperate in the project was given detailed instructions for keeping the necessary records. The third step was to collect the record books and obtain some additional information after all crops were harvested. To keep the costs of collecting data to the minimum, no visits were made to any of the cooperators between the time the record books were distributed and the time they were collected. One hundred thirty-two farmers agreed to keep the necessary records; 100 finished the task. Although this sampling procedure permits a possible bias in favor of record keepers, this possible bias was accepted because of the need for accurate and complete labor, power, and machinery records. Some of the farmers did not raise all of the three crops studied and others failed to keep adequate records on all of these crops when grown. Therefore, the number of records available for analysis was as

[1]Assistance was given by J. H. Sitterley and others of the Department of Agricultural Economics and Rural Sociology. Most of the field work was done by Walter Hunnicutt.

[2]Blosser, R. H., "Crop Costs and Returns in West Central Ohio," Ohio Agricultural Experiment Station Research Bulletin 909, June 1962.

[3]Blosser, R. H., "Cost of Producing Crops in Northwestern Ohio," Ohio Agricultural Experiment Station Research Bulletin 923, September, 1962.

[4]Ohio Soil and Water Conservation Needs Inventory, Published by The Ohio Soil and Water Conservation Needs Committee, Columbus, Ohio, December 1961, pp. 54-62.

follows: corn, 97; wheat, 52; hay, one cutting, 42; and hay, two cuttings, 36.

DESCRIPTION OF FARMS STUDIED

Land Use. Acreages of various crops are shown in Table 1 for three different farm size groups. The average farm with less than 300 acres of land had about 40 percent of the total area in rotated crops, 40 percent in permanent pasture and 20 percent in woods and miscellaneous use. Farms above 300 acres in size averaged 28 percent in rotated crops, 39 percent in permanent pasture and 33 percent in woods and miscellaneous areas. Each group of farms had about the same land use program on the rotated land. Corn was grown on about 27 percent of this area, small grain was raised on 22 percent and hay and rotation pasture occupied the remaining 51 percent. This cropping program which approximates a four-year rotation is adaptable to an effective contour strip cropping program which requires a strip of sod between each strip of grain.

Crop Production. Yields per acre for the various crops and different acreages grown are shown in Table 2. Corn yields on the farms studied averaged about one-third higher in 1960 than the average yield reported by the U.S. Crop Reporting Service for the seven counties in which these farms were located. Wheat yields averaged 10 percent higher.

HOW COSTS WERE CALCULATED

All costs were based on 1960 production methods and prices. Labor charges, which were based on having the farm operator provide his own house and food, were calculated at $1.50 an hour. These charges could be reduced somewhat, if the farmer were given a rent-free house and a garden plot. However, this reduction in labor cost would be largely offset by a higher land charge to provide for a dwelling.

Most of the labor used in producing crops was direct field work. However, a small amount of miscellaneous labor also was included for such jobs as hauling fertilizer from the dealer's delivery point to the farm, getting equipment ready for use, cleaning and storing equipment after use, and making the necessary machinery repairs. The amount of miscellaneous labor charged against each acre of crops was as follows: corn, .5 of an hour; wheat and one cutting of hay, .4; and two cuttings of hay, .6 of an hour. These miscellaneous labor requirements are based on a 1958 study of crop costs in west central Ohio because only a few of the southeastern Ohio farmers kept detailed records on the amount of miscellaneous labor used. No labor or tractor time was charged against the crops for building fences or hauling manure.

Tractor and machinery charges were figured on the basis of size and number of hours used in a year. A detailed list of these charges for different size tractors and equipment and different intensities of use is given in Appendices A and B. The amount of man labor and tractor power used includes the time spent moving equipment to and from fields and the amount of time spent doing the necessary field work.

No charges for fertilizer and manure were made against the first year meadows that were harvested for hay. This procedure was based on the assumption that first year legume-grass meadows would add enough nitrogen in roots and stubble to offset the value of the phosphorus and potash removed by the hay crop. However, all meadows cut for hay after the first year of harvest were charged $5 an acre for the mineral nutrients removed ($2.50 in the form of fertilizer and $2.50 in the form of manure).

Three steps were used in calculating fertilizer and manure charges for the grain crops. The first one was to determine the value of all fertilizer and manure applied to the rotated land. The second step was to substract from the value of the fertilizer and manure applied $5 for each acre of harvested hay that had been allowed to stand longer than one year. The third step was to prorate the remaining fertilizer and manure charges to the various grain crops, and straw when harvested, on the basis of the way each grain crop normally removes nitrogen, phosphorus and potash from the soil[5]. This method of figuring fertilizer and manure costs gives first-year meadows some credit for the beneficial effects they impart to succeeding grain crops. It also comes closer to showing the actual costs of supplying mineral nutrients to the grain crops than is possible when a portion of the fertilizer and manure is charged against the first-year meadows.

Fertilizer was charged at actual cost. The analyses most commonly used and their costs per ton were: 6-24-12, $75; 3-12-12, $48; 12-12-12, $72; 5-20-20, $73; 5-10-10, $50; and ammonium nitrate $80. Manure was valued at $2 a ton. Cost of lime was prorated equally among the various crops grown on the rotated land. Price paid per ton including spreading averaged $5.80 for agricultural ground limestone.

[5]The amount of plant nutrients removed by different crops is given in the Handbook of Ohio Experiments in Agronomy, Ohio Agricultural Experiment Station, November 1957, p. 21.

An estimated land charge of $8 an acre was used for each crop[5a]. After deducting an annual tax of $1.25 an acre, the remaining land charge allowed a five percent return on a $135 land valuation. This land charge does not include the use of a farm house for the operator or any costs for livestock buildings. It also applies only to hill land. In most cases, higher charges should be made for the use of land located along streams, creeks, and rivers. Also, higher land charges should be made if a dwelling were included. The same land charge was used for each farm because of the difficulty of determining the true market value of the cropland on which records were kept.

COSTS FOR DIFFERENT CROPS

Corn. The total cost of producing an acre of corn declined as number of acres in corn increased (Table 3). Most of these reductions in cost resulted from smaller charges per acre for labor and tractor power. The smaller labor charges on the large farms were partly due to the use of larger machinery which reduced the amount of man labor needed to accomplish a particular job[6]. Machinery charges were kept to the minimum on the small farms by hiring the corn harvested and owning some of the machines on a partnership basis. Almost 60 percent of the farmers who raised less than 15 acres of corn hired the crop harvested. But only 20 percent of the farmers hired this crop harvested when they raised between 15 and 29 acres.

The cost of a bushel of seed corn and a gallon of spray material was approximately the same for the different groups of farms. Seed corn averaged $10.30 a bushel and spray material $3.50 a gallon.

When 2-14 acres of corn or an average of 10 were raised, cost per acre averaged about $70 or 87 cents per bushel; 15-29 acres or an average of 24 cost $63 an acre or 79 cents per bushel; and 30-100 acres of corn or an average of 50 cost $59 an acre or 74 cents per bushel. These costs are based on an 80 bushel per acre yield which is the average amount the farmers said they normally produced[7]. Ranges in costs per acre for the middle half of the farms in each size group are shown in Appendix Table D for the various crops and acreages raised.

Physical inputs used by farmers to produce an acre of corn are given in Table 4. The prorated fertilizer application in pounds was determined by dividing the prorated cost of this item in Table 3 by 2.5 cents which was the cost of a pound of 5-10-10 fertilizer. This analysis was selected because nitrogen, phosphorus, and potash were applied to corn in a ratio that averaged about 1-2-2 for all farms. Applications of lime are in terms of agricultural ground limestone.

Wheat. The average cost of producing an acre of wheat was about $43, or $1.54 per bushel. These costs are based on a 28 bushel per acre yield which is the average amount the farmers said they normally produced (Table 5). Almost half of the farmers who raised less than 14 acres of wheat hired the crop harvested. But only one-fourth of the farmers hired this crop harvested when they raised 14 or more acres. Cost of seed wheat averaged $2.25 per bushel.

Physical inputs used by farmers to produce an acre of wheat are given in Table 6. The prorated fertilizer application in pounds was determined by dividing the prorated cost of this item in Table 5 by 2.5 cents which was the cost of a pound of 5-10-10 fertilizer. This analysis was selected because nitrogen, phosphorus, and potash were applied to wheat in a ratio that averaged about 1-2-2 for all farms. Applications of fertilizer and manure include only the amount prorated to the grain crop.

Hay. The average cost of producing 26 acres of first cutting hay was about $34 an acre or $18 per ton. For 48 acres, the average cost per acre was about $31 or $16.50 per ton when no pasturing was done the remainder of the season (Table 7). These costs were determined for the 1960 yield of hay that averaged 1.9 tons per acre for each group of farms.

The average cost of producing an acre of hay that was cut twice was about $45 or $15.50 a ton for a 2.9 ton yield.

Seed costs averaged $25 a bushel for alfalfa, $24 for red clover and $8 per bushel for timothy. The average cost of spray material was $3.50 per gallon.

Charges for fertilizer, manure, and seed in Table 7 apply only to first year meadows. When meadows are kept beyond the first year of harvest, some charge should be made for the fertilizer and manure used. Only first year meadows can be expected to add as much value to the soil in the form of nitrogen as they remove in the form of phosphorus and potash. In many cases, fertilizer and manure charges for meadows over one year old may be largely offset by lower seed charges if all of the seed is charged against the first year hay crop.

Physical inputs used by farmers to produce an acre of hay are shown in Table 8. Seeding rates for

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[5a] This estimate was based on information provided by H. R. Moore, Department of Agricultural Economics and Rural Sociology, Ohio Agricultural Experiment Station.

[6] A detailed analysis of size of machinery used on different size farms is given in Appendix C.

[7] A more detailed discussion of the relationship between crop costs and size of farm is given in the following publication: Blosser, R. H., "Crop Costs and Returns in West Central Ohio," Ohio Agricultural Experiment Station, Research Bulletin 909, June 1962, pp. 12-15.

meadows cut once averaged 7.2 pounds of alfalfa, 4.2 pounds of red clover, and 4.6 pounds of timothy per acre. Seeding rates for meadows cut twice averaged 8.2 pounds of alfalfa, 3.8 pounds of red clover, and 4.1 pounds of timothy per acre.

Straw. The additional cost of producing an acre of straw beyond small grain harvest was $16.74 for a yield of 1.1 tons (Table 9). This figure includes a prorated fertilizer charge that would pay for about 90 pounds of a 5-10-10 analysis and a prorated manure charge for .5 of a ton per acre. It does not include any charge for the use of the land because this item was charged completely against the wheat crop. Man labor used per acre amounted to 3.7 hours. Power requirements averaged 1.6 hours for a two-plow tractor and .6 of an hour for a three-plow tractor.

AMOUNT OF TIME USED FOR SPECIFIC CROP WORK

The amount of man labor, tractor power and machine time used to perform the various jobs needed to produce crops is shown in Table 10. These time requirements are stated in two ways. One is an average figure that shows the amount of time reported by the median farmer in each job group. The other shows the range in the amount of time used by the middle 50 percent of the farmers to perform a particular job. The amount of work accomplished in a given time with a certain size machine varied considerably because of differences in the rate of travel that machines were operated, frequency of equipment breakdown, amount of time needed to move machines to and from fields, weather, yields, and size of fields.

Table 1. Average Acreage of Crops Grown on Three Groups of Farms in Southeastern Ohio in 1960

Land Use	Size of Farm					
	73-160 Acres (33 farms)		161-300 Acres (42 farms)		301-320 Acres (25 farms)	
	Acres	Percent	Acres	Percent	Acres	Percent
Corn	12	9	28	12	32	7
Oats	4	3	8	4	14	3
Wheat 1/	6	5	13	6	13	3
Hay	23	18	40	18	58	13
Rotation pasture	2	2	5	2	8	2
Rotated cropland	47	37	94	42	125	28
Permanent pasture	54	43	85	38	172	39
Woods	18	14	30	14	118	27
Miscellaneous	7	6	13	6	25	6
Total	126	100	222	100	440	100

1/ Includes a small amount of barley and rye.

Table 2. Yields for Different Acreages of Crops Grown in Southeastern Ohio in 1960

Crop	Acres Per Farm		Number of Farms in Group	Yield Per Acre 1/
	Range	Average		
Corn	2- 14	10	35	82
Corn	15- 29	24	37	78
Corn	30-100	50	25	83
Wheat	2- 13	9	26	31
Wheat	14- 40	22	26	33
Hay, 1 cutting	13- 39	26	21	1.9
Hay, 1 cutting	40-76	48	21	1.8
Hay, 2 cuttings	13- 30	21	18	2.9
Hay, 2 cuttings	31-80	44	18	2.8

1/ Grain stated in bushels; hay stated in tons.

Table 3. Cost of Producing an Acre of Corn on 97 Farms in Southeastern Ohio in 1960

Cost	Acres in Corn 2-14 Average 10 (35 farms)	15-29 Average 24 (37 farms)	30-100 Average 50 (25 farms)
Man Labor	$16.20	$12.60	$11.70
Tractor Power	10.39	8.13	7.39
Machinery	10.47	11.28	9.63
Fertilizer	11.90	11.80	11.95
Manure	6.95	6.80	6.00
Lime	3.32	1.97	2.54
Seed	2.13	1.98	2.00
Spray	.27	.30	.26
Land	8.00	8.00	8.00
Total	$69.63 1/	$62.86	$59.47

1/ Differences in cost due to acreage of corn raised were significant at the one percent level. Standard deviations in cost were as follows: $9.08 for the 10 acre group; $4.93 for the 24 acre group; and $6.86 for the 50 acre group.

Table 4. Physical Inputs Used to Produce an Acre of Corn on 97 Farms in Southeastern Ohio in 1960

	Acres in Corn 2-14 Average 10 (35 farms)	15-29 Average 24 (37 farms)	30-100 Average 50 (25 farms)
Man Labor, hours	10.8	8.4	7.8
Tractor power-2 plow, hours	6.1	4.4	3.8
Tractor power-3 plow, hours	2.8	2.6	2.7
Fertilizer, pounds 1/	476	472	478
Manure, tons	3.5	3.4	3.0
Lime, tons	.5	.3	.5
Seed, pounds	11.2	10.4	11.1
Spray, pints	.6	.7	.6

1/ Adjusted to a 5-10-10 analysis that cost $50 a ton.

Table 5. Cost of Producing an Acre of Wheat on 52 Farms in Southeastern Ohio in 1960

Cost	Acres in Wheat	
	2-13 Average 9 (26 farms)	14-40 Average 22 (26 farms)
Man Labor	$ 7.20	$ 6.45
Tractor Power	4.30	3.99
Machinery	8.68	8.61
Fertilizer	6.05	5.90
Manure	2.50	2.15
Lime	2.54	2.52
Seed	4.56	4.38
Land	8.00	8.00
Total	$43.83 1/	$42.00

1/ Differences in cost due to acreage of wheat raised were not significant at the five percent level. Standard deviations in cost were as follows: $4.98 for the 9 acre group; and $3.75 for the 22 acre group.

Table 6. Physical Inputs Used to Produce an Acre of Wheat on 52 Farms in Southeastern Ohio in 1960

	Acres in Wheat	
	2-13 Average 9 (26 farms)	14-40 Average 22 (26 farms)
Man labor, hours	4.8	4.3
Tractor power-2 plow, hours	2.4	1.9
Tractor power-3 plow, hours	1.3	1.5
Fertilizer, pounds 1/	242	236
Manure, tons	1.3	1.1
Lime, tons	.4	.5
Seed, bushels	2.0	2.0

1/ Adjusted to a 5-10-10 analysis that cost $50 a ton.

Table 7. Cost of Producing an Acre of Hay on 78 Farms in Southeastern Ohio in 1960

Cost	One Cutting		Two Cuttings	
	13-39 Acres Average 26 (21 farms)	40-76 Acres Average 48 (21 farms)	13-30 Acres Average 21 (18 farms)	31-80 Acres Average 44 (18 farms)
Man labor	$ 6.90	$ 6.15	$11.25	$10.35
Tractor power	3.27	2.58	5.45	4.96
Machinery	6.59	5.33	11.79	9.34
Fertilizer & Manure	.00	.00	.00	.00
Lime	2.44	2.56	2.36	2.91
Seed	5.47	5.28	5.76	5.56
Spray	.13	.13	.04	.00
Twine & wire	1.36	1.23	2.03	1.86
Land	8.00	8.00	8.00	8.00
Total	$34.16 1/	$31.26	$46.68 2/	$42.98

1/ Differences in cost due to acreage of hay harvested (one cutting) were significant at the two percent level. Standard deviations in cost were as follows: $3.49 for the 26 acre group; and $3.35 for the 48 acre group.

2/ Differences in cost due to acreage of hay harvested (two cuttings) were not significant at the five percent level. Standard deviations in cost were as follows: $6.74 for the 21 acre group; and $5.04 for the 44 acre group.

Table 8. Physical Inputs Used to Produce an Acre of Hay on 78 Farms in Southeastern Ohio in 1960

	One Cutting		Two Cuttings	
	13-39 Acres Average 26 (21 farms)	40-76 Acres Average 48 (21 farms)	13-30 Acres Average 21 (18 farms)	31-80 Acres Average 44 (18 farms)
Man labor, hours	4.6	4.1	7.5	6.9
Tractor power-2 plow, hours	2.0	1.8	3.1	3.9
Tractor power-3 plow, hours	.8	.6	1.6	.9
Lime, tons	.4	.4	.4	.5
Clover and alfalfa seed, pounds	11.4	11.2	12.3	11.6
Timothy seed, pounds	5.4	3.9	3.9	4.3
Spray, pint	.3	.3	.1	.0

Table 9. Cost of Producing an Acre of Straw Beyond Small Grain Harvest on 36 Farms in Southeastern Ohio in 1960

Cost	Cost per Acre 1/ (1.1 ton yield)
Man labor	$ 5.55
Tractor power	2.42
Machinery	4.58
Twine and wire	.77
Fertilizer 2/	2.32
Manure 2/	1.10
Total	$16.74

1/ All land costs were charged against the wheat crop.
2/ These charges were calculated by the same method that was used to prorate fertilizer and manure charges for the grain crops.

Table 10. Labor and Power Used Per Acre to do Various Jobs Needed to Produce Crops on Hill Land in Southeastern Ohio in 1960

Operation	Number of Cases	Size of Tractor in Plows	Size of Machine Operated	Man Hours Used Per Acre 1/ Average	Man Hours Used Per Acre 1/ Range for Middle Half of Farms
Plow	14	2	2-12"	1.84	1.55-1.98
Plow	49	2	2-14"	1.70	1.42-2.00
Plow	23	3	3-14"	1.06	.96-1.25
Disk	20	2	6 ft.	.60	.55- .79
Disk	43	2	7 ft.	.55	.45- .74
Disk	30	3	7 ft.	.48	.41- .54
Disk	31	2	8 ft.	.50	.36- .67
Disk	27	3	8 ft.	.47	.36- .60
Cultipack	12	2	8 ft.	.36	.26- .43
Plant corn	94	2,3	2 row	.80	.63-1.14
Rotary hoe corn	42	2,3	2 row	.33	.25- .50
Spray corn	38	2,3	6 row	.33	.25- .47
Cultivate corn 1st time	90	2,3	2 row	.63	.50- .86
Cultivate corn 2nd time	57	2,3	2 row	.55	.43- .65

Table 10.--Continued--Labor and Power Used Per Acre to do Various Jobs Needed to Produce Crops on Hill Land in Southeastern Ohio in 1960

Operation	Number of Cases	Size of Tractor in Plows	Size of Machine Operated	Man Hours Used Per Acre[1] Average	Man Hours Used Per Acre[1] Range for Middle Half of Farms
Pick corn-70 bu.	15	2,3	1 row	1.71	1.40-2.00
Pick corn-90 bu.	19	2,3	1 row	2.06	1.87-2.27
Pick corn-80 bu.	17	2,3	2 row	1.13	.80-1.37
Haul & store corn-70 bu.	40	2,3	----	1.32[2]	1.00-1.74[11]
Haul & store corn-90 bu.	40	2,3	----	1.65[3]	1.29-2.00[11]
Sow wheat	24	2,3	12 x 7	1.00[4]	.70-1.33[11]
Sow wheat	26	2,3	13 x 7	.90[5]	.67-1.31[11]
Combine wheat	6	2,3	5 ft.	1.47	1.17-1.64
Combine wheat	17	2,3	6 ft.	1.10	.92-1.42
Combine wheat	7	2,3	7 ft.	.97	.74-1.00
Haul & store wheat	40	2,3	----	.67[6]	.50- .93[11]
Mow hay	14	2,3	6 ft.	.67	.63- .72
Mow hay	68	2,3	7 ft.	.55	.46- .73
Mow straw	33	2,3	7 ft.	.54	.43- .71
Rake hay	75	2,3	7 ft.	.48	.38- .54
Rake straw	39	2,3	7 ft.	.50	.36- .53
Bale hay-1.5 tons	15	2,3	----	.58	.48- .78
Bale hay-2.2 tons	17	2,3	----	.75	.60-1.00
Bale straw- .9 ton	21	2,3	----	.60	.50- .67
Bale straw-1.4 tons	13	2,3	----	.67	.57- .87
Haul & store hay 1.5 tons	16	2,3	----	1.61[7]	1.45-2.22[11]
Haul & store hay 2.2 tons	21	2,3	----	2.40[8]	1.65-2.75[11]
Haul & store straw .9 ton	19	2,3	----	1.20[9]	1.00-1.83[11]
Haul & store straw 1.4 tons	17	2,3	----	1.50[10]	1.16-1.86[11]

1/ Number of tractor and machine hours used per acre is also the same as the number of man hours unless otherwise stated.
2/ Tractor time, .65 hour
3/ Tractor time, .71 hour
4/ Tractor time, .69 hour
5/ Tractor time, .67 hour
6/ Tractor time, .46 hour
7/ Tractor time, .53 hour
8/ Tractor time, .67 hour
9/ Tractor time, .50 hour
10/ Tractor time, .50 hour
11/ These range figures apply only to man hours.

Appendix Table A. Machinery Charges Used in Calculating Crop Costs 1/
(Based on Size of Machine and Hours of Use)

Machine and Size	Cost Per Hour When Used: 20 Hrs. Per Year	40 Hrs. Per Year	60 Hrs. Per Year	100 Hrs. Per Year	150 Hrs. Per Year	250 Hrs. Per Year	350 Hrs. Per Year
Tractor plow-2-12"	$ 1.75	$ .95	$ .65	$ .45	$ .34	$ .32	$ .30
Tractor plow-2-14"	2.00	1.05	.75	.50	.40	.37	.34
Tractor plow-3-14"	3.10	1.65	1.20	.80	.60	.56	.54
Disk-6 ft.	1.95	1.00	.70	.40	.32	.29	.27
Disk-7 ft.	2.15	1.10	.75	.45	.35	.31	.29
Disk-8 ft.	2.30	1.20	.80	.50	.38	.33	.31
Cultipacker-8 ft.	1.25	.65	.45	.35	.30	.27	.25
Spiketooth harrow-8 ft.	.25	.14	.09	.06	.05	.04	.04
Spiketooth harrow-10 ft.	.35	.18	.12	.07	.06	.05	.05
Drag-8 ft.	.25	.12	.08	.05	.04	.04	.04
Corn planter-2 row	1.75	.90	.65	.55	.50	.45	.42
Rotary hoe-2 row	1.30	.65	.45	.30	.25	.23	.21
Cultivator-2 row	2.10	1.05	.75	.50	.35	.25	.23
Sprayer-6 row	1.15	.60	.40	.25	.18	.16	.15
Corn picker-1 row	10.20	5.25	3.60	2.25	1.60	1.40	1.25
Corn picker-2 row	15.65	8.05	5.50	3.50	2.45	2.15	1.90
Grain drill-12x7 in.	3.20	1.70	1.15	.95	.85	.80	.75
Grain drill-13x7 in.	3.40	1.80	1.25	1.00	.90	.85	.80
Combine-5 ft.	13.40	6.90	4.70	3.00	2.10	1.60	1.50
Combine-6 ft.	16.40	8.40	5.80	3.60	2.60	1.90	1.80
Combine-7 ft.	22.40	11.50	7.90	5.00	3.50	2.60	2.50
Mower-6 ft.	2.30	1.20	.85	.55	.43	.36	.34
Mower-7 ft.	2.70	1.40	1.00	.65	.50	.42	.40
Side delivery rake-7 ft.	2.90	1.50	1.10	.70	.65	.60	.55
Hay baler-twine 2/	12.50	6.40	4.35	2.75	1.95	1.40	1.30
Hay baler-wire 2/	15.75	8.05	5.50	3.45	2.45	1.80	1.65
Elevator	2.80	1.45	1.00	.60	.55	.50	.45

1/ Calculated from figures given in the following article: Richey, C. B., "Crop Machines Use," Agricultural Engineers' Yearbook, published by American Society of Agricultural Engineers, 1959 Edition, p. 106.
2/ Does not include cost of baling twine or wire.

Appendix Table B. Tractor Charges Used in Calculating Crop Costs 1/
(Based on Size of Tractor and Hours of Use)

Size	Cost Per Hour When Used: 300 Hrs. Per Year	400 Hrs. Per Year	500 Hrs. Per Year	600 Hrs. Per Year	700 Hrs. Per Year	800 Hrs. Per Year
2-plow	$1.25	$1.10	$1.00	$ .90	$ .80	$ .75
3-plow	1.70	1.50	1.40	1.30	1.20	1.15
4-plow	2.15	1.90	1.80	1.70	1.60	1.55

1/ These charges are based on data from the following publications:
"Farm Management Handbook," Department of Agricultural Economics, New York State College of Agriculture, Cornell University, Ithaca, New York, A.E. Ext. 2, December, 1958.
Day, C. L. and M. M. Jones, "Farm Tractor Costs," University of Missouri, College of Agriculture, Agricultural Experiment Station, Bulletin 662, October, 1955.
Mueller, A. G., "Detailed Cost Report for Northern Illinois, 1956," Department of Agricultural Economics, College of Agriculture, University of Illinois, Urbana, Illinois, Research Report AERR-21, March 1958.

Appendix Table C. Size of Machinery Used to Produce Crops on Different Size Acreages in Southeastern Ohio in 1960

Machine	Acres in Corn		
	10	24	50
Plow-bottoms	2.0	2.3	2.6
Disk-feet	7.0	7.3	7.6
Corn planter-rows	2.0	2.0	2.2
Cultivator-rows	2.0	2.0	2.0
Corn picker-rows	1.0	1.3	1.5
	Acres in Wheat		
	9	22	
Grain drill-disks	12	12	
Combine-feet	5.8	6.4	

Appendix Table D. Range in Crop Costs Per Acre for Middle Half of Farms in Each Size Group, Southeastern Ohio, 1960

	Corn		
Range in Acres Harvested	2-14	15-29	30-100
Average Acreage Harvested	10	24	50
Number of Farms in Group	35	37	25
Range in Costs per Acre	$62.29-75.12	$57.99-66.33	$53.04-62.84
	Wheat		
Range in Acres Harvested	2-13		14-40
Average Acreage Harvested	9		22
Number of Farms in Group	26		26
Range in Costs Per Acre	$39.92-43.97		$37.73-43.35
	Hay		
Number of Cuttings	1		2
Range in Acres Harvested	13-39	40-76	13-30	31-80
Average Acreage Harvested	26	48	21	44
Number of Farms in Each Group	21	21	18	18
Range in Costs Per Acre	$31.21-35.09	$28.12-33.21	$39.93-47.92	$38.65-46.40